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BAFFLING THE SPEAKER

From an article by R. M. Gilbert in "Radio."

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Many an amateur has a dynamic type speaker that he would like to use in conjunction with his radio and recording equipment, but is at a loss when it comes to choosing and calculating dimensions for a suitable enclosure. For those faced with such a problem this article is written.

To be considered really high fidelity a speaker system should reproduce all frequencies from 30 to 1600 cycles per second with a response that is flat within about 5db. For the purposes of illustration a lower limit of 30 cycles has been chosen in the following designs.

For adequate baffling down to 30 cycles a baffle 36.3 feet square is necessary. Obviously for home use, such a large baffle is out of the question. To obtain the beneficial effects of such a baffle and still stay within reasonable limits as to size, some form of cabinet enclosure seems to be the best answer at present.

Before going ahead with the cabinet design it might be in order to mention that the effect of an infinitely large baffle can be obtained by mounting the speaker unit in the ceiling of a room or in one of the walls.

INFINITE BAFFLE.

One of the simplest enclosures that can be built to provide the necessary baffling action is an 'infinite baffle.' It consists of a box with a single hole for the speaker, strongly constructed and with the walls braced to prevent vibration. The shape is unimportant as long as the box is large enough for its resonant frequency to fall at or outside the lower limit of the speakers response range, and has sufficient lining of high absorption material. A half inch layer of mineral wool felt or rug cushioning will usually be enough.

A 12 inch speaker requires a box of about 8 cubic feet volume. Using this as a basis the following table gives the approximate box sizes for various speakers.

<u>Speaker Size</u>	<u>Volume of Box</u>		<u>Speaker Size</u>	<u>Volume of box.</u>
18 inch	12 cubic feet	..	10 inch	6.7 cubic feet
15 "	10 "	..	8 "	5.3 "
12 "	8 "	..	6 "	4. "

ACOUSTICAL LABYRINTH.

An acoustical labyrinth speaker is one having a long tube closely coupled to the rear of the cone. The tube should be one-half wavelength long at a frequency near the lower end of the response range, and is normally folded into a console cabinet, with the open end at the bottom or in the front of the cabinet.

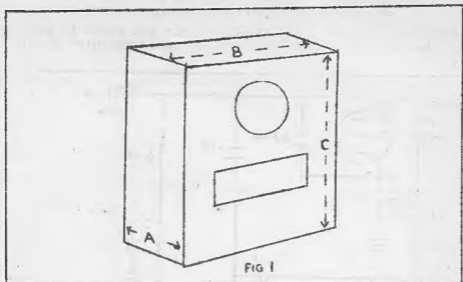
The absorption of the tube lining increases with frequency thereby greatly attenuating all except the lower frequencies. Making the tube a half wavelength long causes a re-inforcement of the front radiation of the cone by the radiation from the tube, since these are in phase at this point. The cross-sectional area of the tube should be approximately equal to the area of the speaker cone (as calculated by formula given later).

Not all of the improvement of the response range credited to the labyrinth is due to re-inforcement of the low frequencies, however, a great deal of improvement is the result of the baffling action of the long tube.

VENTED ENCLOSURE.

A vented enclosure for a speaker is another type of cabinet baffle which improves the speakers low frequency response by the in-phase addition of the back radiation to the front radiation of the cone at these low frequencies.

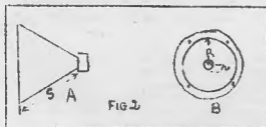
It consists of a box having two holes in the front, one for mounting the speaker, and the other by which the air in the box is acoustically coupled to the outside air. The box is partially lined with an absorbent material such as felt to absorb the higher frequencies and to prevent cabinet resonance. The cabinet should not be completely damped, as is required for the "infinite baffle" type cabinet. It is best to locate the speaker hole and vent fairly close together.



In the following table dimensions are given for various sizes of speakers. A, B, and C represent the measurements at the points indicated on the sketch.

Speaker.	A.	B.	C.	Volume
8 inch	9 $\frac{7}{8}$	16	22 $\frac{1}{8}$	3495
10 "	10 $\frac{7}{8}$	19 $\frac{3}{4}$	26 $\frac{1}{4}$	5640
12 "	11 $\frac{3}{8}$	22	28 $\frac{7}{8}$	7230
15 "	12 $\frac{3}{8}$	23 $\frac{3}{4}$	31 $\frac{7}{8}$	9570

The linear dimensions are inside dimensions in inches and the volumes are in cubic inches. The diameter of the speaker mounting is not given as it depends upon the speaker to be used.

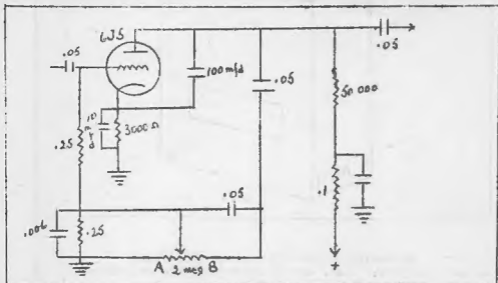


The vent area likewise depends upon the particular speaker involved and can be easily calculated by the formula $A = 3.14 \times S (R^2 - r^2)$ where A is the area in square inches, S is the slant height as shown in Fig 2 a, and R and r are one half of the diameter of the mouth of the

(Continued on page 5)

TONE CONTROL BY NEGATIVE FEEDBACK

Willard Woody in QST describes a circuit which is claimed to give an exceptionally wide range control from high treble to deep bass.



With the arm of the potentiometer at A, the 250,000 grid resistance is shorted out and the .05 mfd plate condenser is connected as a bypass to ground, giving maximum bass. With the arm at B the .05 mfd bypass is high above ground and the feedback voltage is maximum, with feedback taking place only at low frequencies, due to the .006 grid shunt. The high audio frequencies are passed and the lows attenuated at 'B'.

NEW TYPE OF RECORD CHANGER

A new type of record changer which plays both sides of the record without turning it over has recently been announced by RCA Victor.

The essential feature of the new design is a tandem tone arm with two pick-up heads one of which is used to play the underside of the record. A special light movement with a permanent sapphire needle has been designed, which will follow the groove faithfully with less pressure than is required to lift the record or cause it to slip on the diminutive turntable,

which, with underside playing, must be smaller than the title label.

Up to fifteen records are stacked on the three automatic release supports arranged around the outside of the record. The bottom record is dropped on to the turntable and played in the usual way by the top pick-up. At the end of the record the arm swings out, the turntable is stopped and restarted in the opposite direction and the bottom pick-up is gently raised into contact with the run-in groove of the underside of the record.

Finally, the dual tone arm swings clear of the record which is then gently deposited through a slot into a felt lined compartment at the side.

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(Continued from page 3)

condenser of the voice coil respectively. Shape of the vent is unimportant--either round or rectangular being equally good.

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PARAGRAPHS FROM THE PAST

... Radio Amateurs ...

- Broadcast Listeners -

PATRONISING ATTITUDE?

It is the current fashion for the lords of the amateur world to speak very patronisingly of the common herd of broadcast listeners, as if some special wisdom had been vouchsafed to amateurs that is withheld from the mere listener-in, says a writer in "Radio."

In a very few isolated cases, which are not by any means anywhere in the full glare of the limelight, this acquisition of wisdom may be taken for granted, but it is only fair to reveal to the general public that if it wants really sound practical advice on such aspects of wireless as concerns it most, then the best man to go to is certainly not the average amateur or his official organisation. Outside of a few special "stunts" the usual amateur is even as you and I, only less so.

The very fact that he holds broadcasting in supreme contempt or merely indulges in it as in secret vice, like

those who drink after 6 p.m or go to church between Saturday and Monday, puts him at once under suspicion as a hopeless incompetent in subinary affairs.

The safest man to go to for advice on broadcasting reception is still and undoubtedly a reputable dealer, and even if he be charged more, and more openly, for his advice and shameless ly recommends his own goods, he will cost you far less in the long run than the average amateur fonsicker.

(An extract from the Sunday Sun December 27th 1925)

P.M.G. AUTHORISES WAVELENGTHS FOR EXPERIMENTERS

Information has just come to hand from the Postmaster General's Department through the Chief Inspector of Wireless that the following wavelengths are authorised for experimental transmissions as from 1st January 1929:-

5	metres	to	5.55	metres
10	"	to	10.7	"
20.8	"	to	21.4	"
41	"	to	42.8	"
150.8	"	to	175	"
175	"	to	250	"

These bands are the only bands available for amateurs at present, and it will be probably necessary to rearrange them in about 12 months time, particularly the band 175 metres to 250 metres.

Transmissions on these wavelengths must be confined to experiments and tests, but the Department has decided to permit the exchange between amateurs of messages relating to experiments. In no circumstances can messages for a third party be transmitted without the permission of the Department.

Call signs for experimental stations will in future be prefixed with the letters VK instead of OA as at present. This comes into effect as from 1st January 1929.

(An extract from the Daily Guardian 14/12/28)

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SLOUCH HATS & FORAGE CAPS.

New Orders and "all that" depend entirely upon that utopian ideal of "co-operation" when it comes to news for A.R. for this

ideal is mostly conspicuous by its absence and this column is no exception. Once again, how about a line of news from some of you. Have you any news of some ham's experiences in Malaya. If you live near his home you can easily get some - so - rather than let this column lapse for want of news, let's have a little for next month.

Owing to mail hold-ups, very little news comes to hand these days. One laddie with the "true ham spirit" went to quite a bit of trouble to try and find out how our chaps got on in that "impregnable fortress" of Singapore. I can't guarantee the accuracy of the statement, but it is believed that all our chaps managed to get out safely and I suppose are being bombed again in Java. One presumes Java, as the papers say R.A.A.F. arrived there. Bill Moore was the only one mentioned definitely. If anyone gets anything further, let me know in the next couple of weeks.

I hear that VK2ES took part in the first part of the 2nd Libyan Campaign. Doing some of that hush, hush work per truck he got mixed up in one of Rommel's break throughs. Speeding back to where our lines should have been his truck got bogged in the sand. German tanks were seen, but never came near enough to cause trouble, but I'll bet he breathed a sigh of relief when a friendly tank hove in sight and pulled him out of the sand. With typical ham ingenuity he arrived back in Cairo on Xmas Eve night - judgment!!

From 4RF at Canberra comes the following news which is an example of what a help a little news is in this column.

2EO - Dave is an old timer both in the Navy and in the world of DX, and at present has about 3 20KW rigs and a 2 00 KW rig in his care at the Navies Land Station.

2ACG - Another VK2 working (?) for the Navy. Alan punches a key most of the time and wishes he could CQ occasionally with that 20 KW!

2ANP - Also stationed at a RAN W/T Station punching a key for a crust. Congrats Jack on passing for a "Trained Operator" recently. "Give me the boats" says Jack!

3UI - Alan has probably forgotten how to punch the brass as he is strictly a D/F man now and helps us find the Raiders and what-have-you.

4EL - Eric is longing for the days when he can fight 4RF for choice DX again in the BERUT...! Remember when 4RF beat you to ES5D, SVIRX and CR9AA....? hi hi! Eric keeps the National Stations at VIB on the air these days.

- 4FJ - Roy is comparatively new in the Navy, but should have passed his "Telegraphist" Air Gunners Course, by now down at VLM. Not satisfied with the boats, wants wings as well, hi !
- 4NO - Norm is most likely battling with the mosquitoes, or whatever they have in the far North. Taking bearings at a Navy D/F station in between swotting the pests.
- 4S^u - Cilla prefers the sea and has been on a Corvette for many months now. Its about time you came back to VK om and worked some more DX with the scrap heap super of yours...!
- 4KZ - Cliff is another temporary "Dry land sailor" at Canberra and is a very old VK4. Personally I don't think you are very happy in the Service, Cliff.
- 4RF - Fred remembers the time recently when 2ACG was sending messages to the Fleet; 2ANP was working an overseas routine; 4KZ was reading messages from Admiralty and 4RF had the Australian Navy at his fingertips...all at the same time! "We control the Fleet" hi!

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D I V I S I O N A L N O T E S

- Federal Headquarters -

The position of the smaller States again came under discussion at the February Meeting of the Federal Executive, and it was decided that should a request be received from any Division F.H.Q. would take steps to set up a body to be known as the Wireless Institute of Australia, and enrol members from the States concerned. The Office Bearers would be the present members of Federal Headquarters. Members so enrolled would receive "Amateur Radio" thus enabling contact to be maintained and the most important aspect of the matter would be that the amateurs would not have drifted away from the Institute.

Census Cards still continue to trickle in and very soon an endeavor will be made to co-ordinate the wealth of information obtained. At this stage it is important to point out that you should return your card even though for various reasons you are unable to take any part in the national effort. Some amateurs when questioned regarding the non-receipt of their Census card, have replied that they didn't like sending it in as they weren't on Active Service! Every ham would like to be on Service, but in those cases where it is not there is usually a good reason, so lets have those cards.

The possibilities of forming an Emergency Communication net, similar to that which will operate in America under the Office of Civilian Defence - akin to our N.E.S. was discussed, but it was decided that in view of the number of hams on service, many difficulties would be encountered in having the necessary men available at all times.

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NEW SOUTH WALES DIVISION

The February General Meeting of the Division was held at Y.M.C.A. Buildings, Pitt Street, Sydney on 19th inst., the attendance being the best for some time.

Hams throu ghout Australia will be pleased to learn that Pilot Officer Bill Moore 2HZ and several of his mates, including 2XQ and 2ALW managed to get away from Singapore quite safely.

Our old friend Sid Clarke gave a demonstration with an Audio Oscillator of his own design suitable for Code Practice. In addition Sid brought along another piece of equipment not altogether associated with ham radio, but nevertheless of great interest to those members pres ent.

Members will doubtless join with Council in expressing sympathy to our Vice President 2HP in his recent sad bereavements occasioned by the loss his father, and a nephew who was killed in action whilst serving with the R.A.A.F. in Malaya.

Laurie Williams who occupied the position of Secretary to the New Guinea Amateur Radio League prior to the cess ation of transmissions was another interesting member present and "regaled" the boys with his experiences in Rabaul during the first raids on that.

To that over growing list of hams who have gone to meet the Great Brassfounder whilst serving their country must be added 3EI. 3EI was a Telegraphist in H.M.A.S. Parramatta.

Congratulations to our worthy President 2RA upon joining the ranks of the fathers. Yes, it was a boy and is Ray a proud daddy! At the present I understand that the young blighter has distinct tendencies towards fmo!

The Division has offered to co-operate with the R. I.'s Department in their efforts to track down any enemy transmitters that may exist in this country. Whilst appreciative of the Divisions offer the authorities were of the opinion that as the technical requirements were such it would be imposs ible for the hams to be of any great assistance.

A letter from our old friend Bill Zech VK2ACP informs us that George Best VK2QC recently passed away. 2QC unfortunately was blind but nevertheless was quite a brilliant student in many fields.

VICTORIAN DIVISION

The next monthly meeting will be held on Tuesday 7th April, and if you have an amplifier receiver or any other such equipment, which you wish to test out, bring it along as there will be present at the meeting a cathode ray oscillograph capable of telling you just how the particular piece of gear is working. The instrument will be supplied by Mr. Ivor Morgan 3DH, who has access to this piece of equipment.

- 3KN.. is now of the army attached to area signals. Ron put in an appearance on Tues day night, but its doubtful when we'll see him again.
- 3Fr.. Now has his third stripe. Congrats Fred. The same gentleman is contemplating marriage, but he won't tell us when. Best wishes.
- 3ZK.. is again back in VIM.. Jim is going to be real FB when he gets into action...The practice at zig-zaging will help considerably.
- 3KR.. kept his marriage very very quiet. Maybe just as well. What say Ken? Congratulations anyway..to you and the W.A.A.F.
- 3VH.. is in Syria attached to a signals unit.
- 3WE.. 'Tis rumored that Bill has "gono and dono it"..Time will tell the true story.
- 3NY.. is at present enjoying the country air at Warracknabeal.
- 3DH.. when heard of was doing what a lot of us are doing--playing around with his car headlights.
- 3OF.. is a Petty Officer teaching morse at one of the naval establishments.
- 3JO.. now attends the Institute classes at least three nights a week.. 'Tis understood that he is going to apply to Council to supply a bod.
- 3UQ.. is to be round at No. 1 Recruiting depot where he tests out hopeful W/t's etc.

And in conclusion our congratulations go out to the XYL who did such an excellent job in blacking out the Institute windows.

**THE WIRELESS INSTITUTE
OF AUSTRALIA
VICTORIAN DIVISION**

191 QUEEN ST., MELBOURNE

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Meeting Night—First Tuesday in each month.

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The Division meets on the Third Thursday of each month at Y.M.C.A. Buildings, Pitt Street, Sydney, and an invitation is accorded to all Amateurs to be present.

H A M S !

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BACK ON THE AIR?**



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